

Remarks

Reconsideration of this Application is respectfully requested.

Upon entry of the foregoing amendment, claims 2, 4, 13, and 19-28 are pending in the application, with claims 2, 19, and 23 being the independent claims. Claims 4, 19, and 23 are sought to be amended. Applicants reserve the right to prosecute similar or broader claims, with respect to the amended claims, in the future. New claims 26-28 are sought to be added. Paragraphs [0017], [0018], and [0021] of the specification are sought to be amended. These changes are believed to introduce no new matter, and their entry is respectfully requested.

Based on the above amendment and the following remarks, Applicants respectfully request that the Examiner reconsider all outstanding objections and rejections and that they be withdrawn.

Objection to the Specification

The Examiner, at page 2 of the Final Office Action, objected to the specification as allegedly failing to provide proper antecedent basis for the claimed subject matter. Without acquiescing to the objection, and merely to expedite prosecution, Applicants have amended paragraphs [0017], [0018], and [0021] so that their description more clearly recites the features of the elements of claims 2 and 4. Support for this amendment is found, for example and without limitation, at originally filed claims 2 and 4 and at Figures 2 and 5. No new matter has been entered. (*See* M.P.E.P. § 608.01(I).) Furthermore, amended paragraphs [0017], [0018], and [0021], and Figures 2 and 5 clearly support the features of the elements of claims 2 and 4 at the same level of detail as presented in these claims. Therefore, Applicants respectfully request that the Examiner reconsider and withdraw the objection to the specification.

Rejections Under 35 U.S.C. § 112

First Paragraph

The Examiner, at page 3 of the Final Office Action, rejected claims 19-25 under the first paragraph of 35 U.S.C. § 112 as allegedly failing to comply with the written description requirement. Applicants respectfully traverse this rejection.

Without acquiescing to the propriety of the rejection, amended independent claim 19 recites, *inter alia*, "a second electrode on the substrate, wherein a separation between the first electrode and the second electrode is about ten nanometers" and amended independent claim 23 recites, *inter alia*, "a second electrode on the substrate and separated about ten nanometers from the first electrode[.]" Accordingly, Applicants respectfully request that the Examiner reconsider claims 19-25 and withdraw the rejection of these claims under the first paragraph of 35 U.S.C. § 112.

Second Paragraph

The Examiner, at page 3 of the Final Office Action, rejected claims 4 and 13 under the second paragraph of 35 U.S.C. § 112 as allegedly being incomplete for omitting essential steps. The Examiner, at pages 3 and 4 of the Final Office Action, states:

Specifically, claim 4 recites "applying an insulator onto the third metal layer; etching a portion of the insulator at the position of the first metal layer and the second metal layer". However, this recitation renders the claims indefinite because it is unclear how a portion of the insulator at the position of the first metal layer and the second metal layer can be etched if it is never formed in the first place. The claim merely recites that the insulator is applied onto the third metal layer and fails to establish that the insulator is on the first and second metal layers.

Without acquiescing to the propriety of the rejection, and based on the amendment to claim 4, Applicants respectfully request that the Examiner reconsider claims 4 and 13 and withdraw the rejection of these claims under the second paragraph of 35 U.S.C. § 112.

Rejections Under 35 U.S.C. § 102

The Examiner, at page 4 of the Final Office Action, rejected claim 2 under 35 U.S.C. § 102(b) as allegedly being anticipated by U.S. Patent Application Publication No. 2002/0164884 to Lishan ("Lishan"). Applicants respectfully traverse this rejection, and the Response to Arguments at page 10 of the Final Office Action.

Independent claim 2 recites, *inter alia*, "**etching** the portion of the surface of the first **metal** layer not having the first photo lacquer" **and** "**undercut etching** the first **metal** layer so that an overhang is defined by the first photo lacquer[.]" (Emphasis added.)

For example, undercut etching of the first metal layer is illustrated, for example, at portions 206 of Figure 2B of the present patent application:

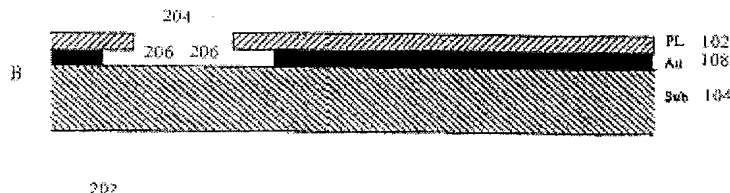
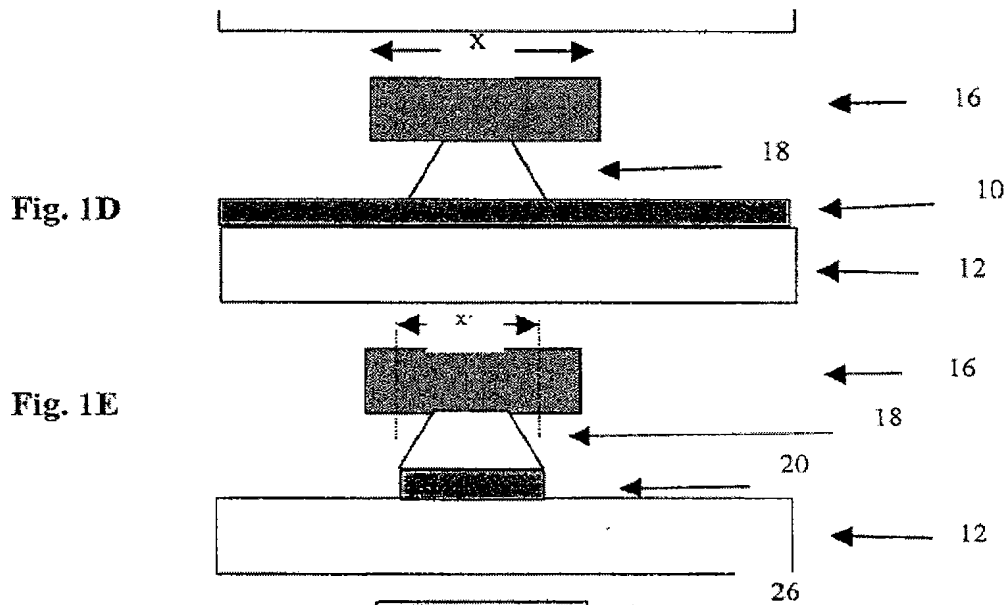


Figure 2B of the present patent application is described, for example, at paragraphs [0017] and [0018] of the specification of the present patent application.

First, no teaching in Lishan shows, teaches, or suggests a first metal layer **having** a photolacquer, so it cannot be said that Lishan could show, teach, or suggest "**etching** the portion of the surface of the first **metal** layer not having the first photo lacquer," as recited in claim 2. Rather, Lishan would not be able to perform this claimed "etching," since none of the metal layer in Lishan has the photo lacquer, thus no metal layer would be left in Lishan. Rather, Lishan does not disclose, teach, or suggest at least these features. Rather, Lishan, at paragraph [0007] recites, *inter alia*, "[t]he **dielectric** can be "over" etched to reduce the dimensions of the dielectric such that the lateral dimension is less than the patterned

photoresist 16 (i.e. the dimension x is less than the dimension x').” (Emphasis added.) As illustrated at Figures 1D and 1E, shown below, of Lishan, it is dielectric layer 8/18, not metal layer 10/20, that is over etched. Then, in Lishan, dielectric layer 8/18 controls the etching of the metal layer 10/20, as also illustrated in Figures 1D and 1E, shown below.



Second, as Lishan does not teach the “etching,” as recited in claim 2, discussed above, Lishan will not have an intermediate structure, e.g., a window in the photo lacquer and metal, allowing for “*undercut etching* the first *metal* layer so that an overhang is defined by the first photo lacquer,” as recited in claim 1. The Examiner, at page 10 of the Final Office Action, contends that the sentence, “Another selective etchant can then be used to remove portions of the metal layer 10 where the dielectric material acts as an etching mask[,]” from paragraph [0007] of Lishan teaches that portions of metal layer 10/20 are undercut etched. Applicants dispute this contention. This passage from Lishan teaches that the portions of *metal* layer 10/20 are merely etched (not “undercut etched” as illustrated, for example, at Figure 2B of the present patent application) and that the etchant used to remove the portions of metal layer 10/20 is different from the etchant used to remove portions of dielectric layer 8/18.

Therefore, independent claim 2 is not anticipated by Lishan. Accordingly, Applicants respectfully request that the Examiner reconsider claim 2, withdraw the rejection of this claim under 35 U.S.C. § 102(b), and pass this claim to allowance.

Rejections Under 35 U.S.C. § 103

Claim 19

The Examiner, at page 5 of the Final Office Action, rejected claims 19-22 under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent Application Publication No. 2004/0075135 to Huang *et al.* ("Huang") in view of U.S. Patent Application Publication No. 2003/0183915 to Scheifers *et al.* ("Scheifers"). Applicants respectfully traverse this rejection, and the Response to Arguments at pages 10 and 11 of the Final Office Action.

Amended independent claim 19 recites, *inter alia*:

a second electrode on the substrate, wherein ***a separation between the first electrode and the second electrode is about ten nanometers***

(Emphasis added.)

The Examiner Uses Impermissible Speculation and Conjecture

Regarding the feature recited in claim 19 of a separation between a first electrode and a second electrode of about ten nanometers, Huang, at paragraph [0035], recites (emphasis added):

As illustrated in FIG. 5, the tool 80 is then removed from the device 10. Suitable types of cooling may be utilized prior to the removal, in order to ensure that the substrate 12 is sufficiently cooled so as to maintain the gap 24 between the source 14 and the drain 16. ***The gap 24 may have a width between the source 14 and the drain 16 of less than 1 μm (micron)***, although it will be appreciated that other widths may be utilized.

As is clearly understood by the Examiner, obviousness requires "a person having ordinary skill in the art (PHOSITA) ***at the time of the invention.***" In light of the desire in the semiconductor industry to produce electron devices with ever smaller feature sizes, it is

unreasonable to read a mere passing reference in Huang that, "***The gap 24 may have a width between the source 14 and the drain 16 of less than 1 μm (micron),***" as teaching to a PHOSITA ***at the time of the invention, e.g., filing of the instant application,*** that Huang taught or suggested "***a separation between the first electrode and the second electrode is about ten nanometers,***" as recited in claim 19. Had the method of Huang been capable of such a vast improvement, e.g., reaching a separation of about 10 nanometers, or 10 times a reduction in magnitude from what Huang taught, Huang would have stated this ability clearly in his patent application.

As provided at section 2144.05(III) of the Manual of Patent Examining Procedure:

Applicants can rebut a *prima facie* case of obviousness based on overlapping ranges by showing the criticality of the claimed range. "The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . . In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range." *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

The Examiner, at page 6 of the Final Office Action, explicitly states at least one criticality of the claimed range, "in order to produce a small transistor size to increase the number of transistors that are packed onto a single substrate, thereby increasing processing power." It was unexpected, at the time of the claimed invention, that an electronic component could be formed with "***a separation between the first electrode and the second electrode is about ten nanometers,***" as recited in claim 19.

For at least these reasons, Applicants respectfully assert that the Examiner's statements regarding Huang improperly and impermissibly go beyond the disclosure of the reference and, without any evidence of record, find their basis only in speculation, which is against current Supreme Court, Federal Circuit, and B.P.A.I. law. As the Supreme Court has

required, the "analysis [of obviousness] should be made explicit." *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1740-41 (2007) (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). "[R]ejections on obviousness grounds cannot be sustained by *mere conclusory statements*; instead, there must be some articulated reasoning with *some rational underpinning* to support the legal conclusion of obviousness." *Id.* (emphasis added). Also, both the Federal Circuit and the B.P.A.I. require the Examiner to show obviousness without relying on mere speculation or conjecture. (See *In re Lee*, 277 F.3d 1338, 1342-44 (Fed. Cir. 2002) (discussing the importance of relying on *objective* evidence and making *specific factual findings* with respect to the motivation to combine references).) (Emphasis added.) Further, section 2144.03(a) of the Manual of Patent Examining Procedure states that "[i]t is never appropriate to rely solely on "common knowledge" in the art without *evidentiary support in the record*, as the principal evidence upon which a rejection was based." (Emphasis added.) (See *In re Zurko*, 258 F.3d 1379, 1385 (Fed. Cir. 2001) ("[T]he Board cannot simply reach conclusions based on its own understanding or experience--or on its assessment of what would be basic knowledge or common sense. Rather, the Board must point to some concrete evidence in the record in support of these findings.").)

In re Rose, In re Reinhart, In re Daily, and Gardner v. TEC Systems, Inc.
Do Not Apply

Particularly in the field of the fabrication of electronic components, *surmising a desire to realize a certain feature size is not the same as disclosing an ability to do so*. For at least this reason, Applicants dispute the contention by the Examiner, at page 6 of the Final Office Action, that "[a] change in size is recognized as being within the level of ordinary skill in the art." In support of this assertion the Examiner cites several cases. However, none of these cases is directed to technology in the field of the fabrication of electronic components.

In re Rose is directed to technology for lifting lumber packages. *In re Rinehart* is directed to production of polyesters. *In re Dailey* is directed to a plastic nursing container. *Gardner v. TEC Systems, Inc.* is directed to a system for drying ink. In *Gardner*, the Federal Circuit held (emphasis added):

where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions **would not perform differently than the prior art device**, the claimed device was not patentably distinct from the prior art device.

(M.P.E.P. § 2144.04 (IV)(A).) Thus, the situation in *Gardner* is different from the situation in the present patent application where the Examiner has recognized that the ability to produce a small transistor size increases the number of transistors that are packed onto a single substrate, thereby increasing processing power. In other words, a small transistor **performs differently** from a large transistor because a small transistor facilitates increasing processing power (i.e., it improves the performance).

In re Aller Does Not Apply

Applicants also dispute the contention by the Examiner, at page 7 of the Final Office Action, that "[i]t has been held that where the general conditions of a claim are disclosed in prior art, discovering the optimal or working ranges involves only routine skill in the art." In support of this assertion the Examiner cites *In re Aller*, which is directed to a range of temperatures and a range of acid concentration in a chemical process. This is different from the ability to fabricate electronic components with "**a separation between the first electrode and the second electrode is about ten nanometers**," as recited in claim 19. The ability to fabricate electronic components having the claimed separation between does not involve "discovering the optimal or working ranges," but rather it is a milestone measurement of a

significant improvement in an ongoing effort to produce electronic components with ever smaller feature sizes.

Thus, based on any of the reasons discussed above, the Examiner has not provided the required *evidentiary* support that the mere passing reference in Huang that, "The gap 24 may have a width between the source 14 and the drain 16 of less than 1 μ m (micron)," teaches a PHOSITA *at the time of the invention* that Huang could be read to teach or suggest "*a separation between the first electrode and the second electrode is about ten nanometers*," as recited in claim 19.

Scheifers Does Not Cure the Deficiencies of Huang

Also, the Examiner, at page 6 of the Final Office Action, contends that "Scheifers teaches a conventional bottom-gate transistor with a sealing layer (Element 16) on the organic semiconductor (Element 14)." Without stipulating to the Examiner's characterization of the teachings of Scheifers, Scheifers does not disclose, teach, or suggest at least the above-noted distinguishing features. Thus, Scheifers does not cure the deficiencies of Huang, and the applied references cannot be used to establish a prima facie case of obviousness.

Therefore, independent claim 19 is patentable over Huang in view of Scheifers. Because each of claims 20-22 depends upon claim 19 and because of the additional distinctive features of each of claims 20-22, these claims are also patentable over Huang in view of Scheifers. Accordingly, Applicants respectfully request that the Examiner reconsider claims 19-22, withdraw the rejection of these claims under U.S.C. § 103(a), and pass these claims to allowance.

Claim 23

The Examiner, at page 7 of the Final Office Action, rejected claims 23-25 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Huang in view of Scheifers in view

of "Free Volume Quantities and Viscoelasticity of Polymer Glasses" by Higuchi *et al.* ("Higuchi"). Applicants respectfully traverse this rejection, and the Response to Arguments section at pages 10 and 11 of the Final Office Action.

Amended independent claim 23 recites, *inter alia*:

a second electrode on the substrate and separated about ten nanometers from the first electrode

(Emphasis added.)

As explained above, neither Huang nor Scheifers discloses, teaches, or suggests at least the above-noted distinguishing features. The Examiner, at pages 7 and 8 of the Final Office Action, contends that "Higuchi teaches that polycarbonate is a glass (see Higuishi [sic] who states that polycarbonate is a polymer glass), which is a glass that is different than SiO₂ (see Higuchi "PC glasses")." Without acquiescing to the Examiner's characterization of the teachings of Higuchi, Higuchi does not disclose, teach, or suggest at least the above-noted distinguishing features. Thus, Higuchi does not cure the deficiencies of Huang and Scheifers, and the applied references cannot be used to establish a prima facie case of obviousness.

Therefore, independent claim 23 is patentable over Huang in view of Scheifers in view of Higuchi. Because each of claims 24 and 25 depends upon claim 23 and because of the additional distinctive features of each of claims 24 and 25, these claims are also patentable over Huang in view of Scheifers in view of Higuchi. Accordingly, Applicants respectfully request that the Examiner reconsider claims 23-25, withdraw the rejection of these claims under U.S.C. § 103(a), and pass these claims to allowance.

New Claims

Applicants seek to add new claims 26-28. Applicants submit that claims 26-28 are allowable over the references of record at least based on their dependency to independent

claims 2, 19, and 23, as discussed above, and further in view of their additional distinguishing features.

For example, new claim 26 recites “said structuring comprises structuring the first photo lacquer on the surface of the first metal layer so that the first photo lacquer is in direct physical contact with the surface of the first metal layer.” Also, new claims 27 and 28 recite additional distinguishing features. For example:

wherein the first electrode and the second electrode are produced by:
forming a first metal layer on the substrate;
forming a photo lacquer on a first portion of the first metal layer;
etching a second portion of the first metal layer to expose a first portion of the substrate;
undercut etching the first metal layer to expose a second portion of the substrate so that an overhang is defined by the photo lacquer;
forming a second metal layer on the first portion of the substrate so that a space is defined between the overhang and the second portion of the substrate; and
removing the photo lacquer so that the first electrode comprises the first portion of the first metal layer and the second electrode comprises the second metal layer.

Neither Huang nor Scheifers, alone or in combination, discloses, teaches, or suggests these distinguishing features of claims 26, 27, and 28.

Implicitly Allowable Subject Matter

Applicants note that claims 4 and 13 were not rejected using any reference, and thus were implicitly allowed over the cited references. If another Office Action is issued, the Examiner is requested to clarify the allowability of claims 4 and 13 since their 35 U.S.C. § 112 rejections have been overcome.

Conclusion

All of the stated grounds of objection and rejection have been properly traversed or accommodated. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the outstanding Final Office Action

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and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.


Timothy A. Doyle
Attorney for Applicants
Registration No. 51,262

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1100 New York Avenue, N.W.
Washington, D.C. 20005-3934
(202) 371-2600